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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,301	03/16/2001	Ola Olsvik	2001-0263A	8103
513	7590	07/26/2004	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P. 2033 K STREET N. W. SUITE 800 WASHINGTON, DC 20006-1021			STRICKLAND, JONAS N	
			ART UNIT	PAPER NUMBER
			1754	

DATE MAILED: 07/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/787,301

Applicant(s)

OLSVIK, OLA

Examiner

Jonas N. Strickland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Detailed Action is in response to the amendment filed on 6/02/2004. Claims 21-40 are currently pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 21-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pagani (CA 868821) in view of JP-05295374 A.

Applicant claims a method for preparing a carbon dioxide rich gas stream and a hydrogen rich gas stream, which comprises feeding natural gas and water into a reforming reactor to form a gas mixture, subjecting the gas mixture to a one-step reforming reaction under supercritical heat and pressure conditions for water to form a reformed gas mixture; and separating the reformed gas mixture into a hydrogen rich gas and a carbon dioxide rich gas stream.

Pagani discloses a steam reforming of methane, which reacts with steam on a special catalyst (p. 1, lines 1-3). Pagani continues to disclose wherein the reforming process occurs in a range from 50 to 250 bar (p. 3, lines 9-14). Pagani continues to

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disclose wherein the temperature in the reforming reactor is at 550°C (p. 3, lines 28-31).

Pagani teaches producing a gas comprised of hydrogen and carbon dioxide. However, Pagani does not disclose wherein the carbon dioxide and hydrogen stream are separated.

JP '374 teaches reforming methane with steam to produce hydrogen and carbon dioxide. JP '374 continues to teach wherein hydrogen is separated and carbon dioxide is also separated (see abstract).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Pagani, based on the teachings of JP '374 by separating hydrogen and carbon dioxide, since JP '374 teaches separating hydrogen and carbon dioxide produced from a steam reforming process. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would have expected a steam reforming process reacts methane (natural gas) and steam (water) to produce hydrogen and carbon dioxide as taught by JP '374 to have been similarly useful and applicable to a steam reforming process which also teaches producing carbon dioxide and hydrogen as taught by Pagani.

Furthermore, it would have been obvious to one of ordinary skill in the art, to expect the methane and water from the reforming reactor to subject the gas mixture to a reforming reaction under supercritical conditions, since Pagani discloses wherein the reforming process occurs in a range from 50 to 250 bar and wherein the temperature in the reforming reactor is at 550°C, which are supercritical heat and pressure conditions for water.

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5. Claims 32-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pagani (CA 868821) in view of JP '374 as applied to claims 21-31 above, and further in view of Kapoor et al. (US Patent 5,714,132).

Applicant claims with respect to claims 32-36, wherein the reforming reaction is carried without a catalyst. Pagani teaches using a catalyst in the reformer for producing a carbon dioxide and hydrogen gas mixture, but does not teach using a reformer without a catalyst.

However, Kapoor et al. teaches a process wherein a hydrocarbon is contacted with water vapor to produce a gaseous effluent comprised of hydrogen and carbon dioxide. Kapoor et al. continues to disclose wherein the reforming reaction is carried out with a catalyst, but may be carried out thermally (col. 2, lines 15-28 and col. 2, lines 40-45).

Therefore, it would have been obvious to one of ordinary skill in the art, to modify the teachings of Pagani in view of JP '374 based on the teachings of Kapoor et al., by carrying out the reforming reaction without a catalyst in a process for producing hydrogen and carbon dioxide, because Kapoor et al. discloses a process for producing hydrogen and carbon dioxide, wherein the reforming reaction is not driven with a catalyst, but through thermal treatment. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill, would expect a process for producing hydrogen and carbon dioxide with a reformer reactor as taught by Kapoor et al., to be similarly useful and applicable to a process for producing hydrogen and carbon dioxide with a reforming reactor as taught by Pagani in view of JP '374.

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6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pagani (CA 868821) in view of JP '374 as applied to claims 21-31 above, and further in view of Ronning et al. (US Patent 5,832,712).

Applicant claims with respect to claim 37, injecting the separated carbon dioxide rich gas stream into marine formations. While Pagani in view of JP '374 teaches producing carbon dioxide, Pagani in view of JP '374 does not teach injecting the separated carbon dioxide rich gas stream into marine formations.

However, Ronning et al. teaches a method for removing carbon dioxide from exhaust gases and wherein carbon dioxide can be compressed and injected either into deep sea water (col. 1, lines 20-25).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Pagani in view of JP '374, based on the teachings of Ronning et al., by injecting carbon dioxide into marine formations, since Ronning et al. teaches wherein carbon dioxide can be compressed and injected either into deep sea water. Such modification would have been obvious to one of ordinary skill in the art, since Ronning et al. teaches a method for removing carbon dioxide and injecting carbon dioxide into deep-sea water, and Pagani and JP '374 teach a process for producing carbon dioxide. Therefore, the carbon dioxide produced by Pagani and JP '374 may be injected into the marine formation as taught by Ronning.

7. Claims 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pagani (CA 868821) in view of JP '374 as applied to claims 21-31 above, and further in view of Beshty (US Patent 4,946,667).

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Applicant claims with respect to claims 38-40, wherein the produced hydrogen may be used for hydrogenation, for fuel cells, and the production of electricity. While Pagani teaches a method for producing hydrogen, Pagani does not wherein the produced hydrogen may be used for hydrogenation, for fuel cells, and the production of electricity.

Beshty teaches a process for producing hydrogen by steam reforming. Beshty teaches wherein hydrogen may be used for hydrogenation, and in fuel cells for the generation of energy (col. 1, lines 15-24).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Pagani and JP' 374, based on the teachings of Beshty, by using hydrogen for hydrogenation, for fuel cells, and the production of electricity, since Beshty teaches wherein hydrogen may be used for hydrogenation, and in fuel cells for the generation of energy. Such modification would have been obvious to one of ordinary skill in the art, since Beshty teaches a method for producing hydrogen by a steam reforming method, and wherein the hydrogen may be used for hydrogenation, for fuel cells, and the production of electricity and Pagani in view of JP '374 teaches a process for producing hydrogen by a steam reforming method. Therefore, the hydrogen produced by Pagani in view of JP '374 may also be used for hydrogenation, fuel cells, and the production of electricity.

Response to Arguments

8. Applicant's arguments filed 6/02/04 have been fully considered but they are not persuasive. Applicant's present invention is directed to a method for preparing a carbon

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dioxide rich gas stream and a hydrogen rich gas stream which involves subjecting a gas mixture of natural gas and water to a one-step reforming reaction under supercritical heat and pressure conditions for water to form a reformed gas mixture, and separating the reformed gas mixture into a hydrogen rich gas stream and a carbon dioxide gas stream. Applicant argues that Pagani is concerned with a steam reforming process for the production of a synthesis gas of carbon monoxide and hydrogen, which is then used for the synthesis of ammonia and methanol. Applicant continues by stating that Pagani teaches wherein there is a production of a transformed gas, which comprises carbon dioxide and other gaseous components. Applicant continues to argue that there is no teaching in Pagani concerning the separation of the transformed gas into a hydrogen rich gas and a carbon dioxide rich gas stream.

It should be noted that Applicant's invention as recited in claim 21 is directed towards a method for feeding natural gas and water into a reforming reactor, which is taught by Pagani. Pagani continues to disclose wherein carbon dioxide and hydrogen are produced in a "transformed gas". Therefore, Pagani clearly teaches producing carbon dioxide and hydrogen from a reforming reactor, which feeds natural gas and water. The instant claims do not exclude other gaseous components, therefore Pagani meets the instant claim. Furthermore, with respect to the reforming conditions of the reactor, Pagani continues to disclose wherein the reforming process occurs in a range from 50 to 250 bar (p. 3, lines 9-14) and wherein the temperature in the reforming reactor is at 550°C (p. 3, lines 28-31). The disclosed temperature and pressure ranges as taught by Pagani are the same reaction conditions required in the reforming reactor

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of the presently claimed invention. Applicant requires in claims 22-24 specific temperature and pressure conditions for the reactor, which is also met by the instant claims.

With respect to claims 25-27, it should be noted that some form of separation had to occur in Pagani, in order to analyze the concentration of carbon dioxide and hydrogen in the gas produced from the reforming reaction. Nevertheless JP'374 has been applied in order to teach reforming methane with steam to produce hydrogen and carbon dioxide. JP '374 continues to teach wherein hydrogen is separated and carbon dioxide is also separated. It would have been obvious to one of ordinary skill in the art to separate carbon dioxide from a hydrogen stream in a reforming reaction as taught by JP '374 under the pressure conditions in a reforming reactor as disclosed by Pagani. With respect to Applicant's arguments regarding the purity of the hydrogen stream of JP'374 in comparison to the present invention, it should be noted that the claims do not require a specific hydrogen concentration. The Examiner has applied JP'374 in order to teach wherein a hydrogen and carbon dioxide stream may be separated in a reforming process.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

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reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonas N. Strickland whose telephone number is 571-272-1359. The examiner can normally be reached on M-TH, 7:30-5:00, off 1st Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonas N. Strickland
July 12, 2004



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